

What is claimed is:

1. A film forming unit for discharging a coating solution from a coating solution discharge nozzle toward a substrate to form a layer on a surface of the substrate, wherein:
 - 5 said coating solution discharge nozzle has a supply flow path for supplying a cleaning fluid to a discharge flow path continuing to a discharging port of said coating solution discharge nozzle.
2. A film forming unit as set forth in claim 1,
 - 10 wherein a supply port of said supply flow path for the cleaning fluid opens toward the inside of said discharge flow path.
3. A film forming unit as set forth in claim 2,
 - 15 wherein a main body of said coating solution discharge nozzle is formed in an approximately tubular shape, and
 wherein a supply flow path continuing to said supply port is formed in said main body.
4. A film forming unit as set forth in claim 3,
 - 20 wherein said supply flow path is inclined diagonally toward the discharging port.
5. A film forming unit as set forth in claim 2,
 - 25 wherein said supply port is provided in plural.
6. A film forming unit as set forth in claim 2,
 - wherein at least said discharge flow path has a water repellant finish against said coating solution.
7. A film forming unit as set forth in claim 1, further comprising;
 - a store portion for the coating solution provided in the main body of said coating solution discharge nozzle and continuing to said discharge flow

path; and

an air-bubble removing apparatus removing air bubbles included in the coating solution and accumulating in an upper portion of said store portion.

8. A film forming unit as set forth in claim 7,

5 wherein said air-bubble removing apparatus has an outlet pipe for letting out the air bubbles, and

wherein the outlet pipe is installed with a valve.

9. A film forming unit as set forth in claim 8,

10 wherein said air-bubble removing apparatus has a suction apparatus sucking said air bubbles through said outlet pipe.

10. A film forming unit as set forth in claim 7, further comprising, a detector for detecting the air bubbles accumulating in the upper portion of said store portion.

11. A film forming unit as set forth in claim 10,

15 wherein at least a part of said outlet pipe is transparent, and said detector has a light emitting unit and a light receiving unit facing each other with the part in between.

12. A film forming unit as set forth in claim 1, further comprising,

20 a detecting member for detecting contamination on said coating solution discharge nozzle as image data.

13. A film forming unit as set forth in claim 1, further comprising,

a diaphragm type pump for supplying the coating solution to said coating solution discharge nozzle;

25 a detection mechanism for detecting changes in amount of push-on of said pump; and

a cleaning controller for controlling the supply of the cleaning fluid by

said supply flow path based on a detected result of the detection mechanism.

14. A film forming unit as set forth in claim 1, further comprising,
a rotary type pump for supplying the coating solution to said coating
solution discharge nozzle and driven by electric power;

5 a detection mechanism for detecting changes in rotation frequency or
changes in electric power consumption of said pump; and

a cleaning controller for controlling the supply of the cleaning fluid by
said supply flow path based on a detected result of the detection mechanism.

15. A film forming unit as set forth in claim 1,

10 wherein said coating solution is a resist solution.

16. A film forming unit for discharging a coating solution from a coating
solution discharge nozzle toward a substrate to form a layer on a surface of
the substrate, comprising;

a press type pump including a pump body for sending said coating
15 solution to said coating solution discharge nozzle, and a press member for
pressing the pump body, the coating solution being sent into the pump body
from the upstream by pulling the press member, the coating solution being
sent from the pump body toward the downstream by pressing the press
member, the amount of coating solution sent toward the downstream being
20 adjusted by the amount of press of the press member,

a pressure detector for detecting pressure in a flow path for the coating
solution between said press type pump and said coating solution discharge
nozzle; and

a controller for controlling the amount of press of the press member of
25 said press type pump based on a detected value from said pressure detector;
the amount of press of the press member of said press type pump

being controlled based on the pressure in the flow path for the coating solution between said press type pump and said coating solution discharge nozzle, to control the amount of discharge of the coating solution to be supplied from said coating solution discharge nozzle toward the surface of the substrate.

17. A film forming unit for discharging a coating solution from a coating solution discharge nozzle toward a substrate to form a layer on a surface of the substrate, comprising;

a press type pump including a pump body and a press member for sending said coating solution to said coating solution discharge nozzle, the coating solution being sent into the pump body from the upstream by pulling the press member, the coating solution being sent from the pump body toward the downstream by pressing the press member, the amount of coating solution sent toward the downstream being adjusted by the amount of press of the press member,

a displacement gauge for detecting the amount of press of the press member of said press type pump; and

a controller for controlling operation of an alarm generating portion based on a detected value from said displacement gauge,

said alarm generating portion being operated when the amount of press of the press member of said press type pump goes out of a preset reference range.

18. A film forming unit for discharging a coating solution from a coating solution discharge nozzle toward a substrate to form a layer on a surface of the substrate, comprising;

a press type pump including a pump body and a press member for

sending said coating solution to said coating solution discharge nozzle, the coating solution being sent into the pump body from the upstream by pulling the press member, the coating solution being sent from the pump body toward the downstream by pressing the press member, the amount of coating solution
5 sent toward the downstream being adjusted by the amount of press of the press member,

a displacement gauge for detecting the amount of press of the press member of said press type pump;

a cleaning portion for cleaning said coating solution discharge nozzle;
10 a drive mechanism for moving said coating solution discharge nozzle to said cleaning portion; and

a controller for controlling operation of said drive mechanism based on a detected value from said displacement gauge,

said coating solution discharge nozzle being moved to the cleaning
15 portion by said drive mechanism for cleaning of the coating solution discharge nozzle when the amount of press of the press member of said press type pump goes out of a preset reference range.

19. A film forming unit for discharging a coating solution from a coating solution discharge nozzle toward a substrate to form a layer on a surface of
20 the substrate, comprising;

wherein said coating solution discharge nozzle includes, a flow path for said coating solution,

a discharging port connected to said flow path for said coating solution for discharging the coating solution in a line form having a very
25 small diameter, and

a filter provided to cross said flow path for said coating solution for

removing air bubbles from the coating solution.

20. A film forming unit as set forth in claim 19,
wherein said filter is made of a porous resin.

21. A film forming unit as set forth in claim 16, further comprising,
5 a substrate holding portion for horizontally holding said substrate,
while said substrate holding portion and said coating solution
discharge nozzle are relatively driven along the plane direction of the
substrate, the coating solution being discharged from the coating solution
discharge nozzle to form a solution layer of the coating solution on a surface
10 of the substrate.

22. A film forming unit as set forth in claim 16, further comprising,
a mixing tank for mixing a coating solution of a high viscosity and
solvent for the coating solution to prepare a coating solution of a low
viscosity, the coating solution prepared in viscosity in the mixing tank being
15 sent to the coating solution discharge nozzle by said press type pump.

23. A film forming unit as set forth in claim 16,
wherein said coating solution is a resist solution.